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PRELIMINARY

MECHANICAL FUNCTION AND SENSITOMETRIC TEST PROCEDURE FOR THE [redacted] PROTOTYPE 9 1/2 [redacted] STAT STAT

DEVELOPED UNDER PHASE II OF

[redacted] STAT

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Revised May 1/67

[redacted] STAT

NOTE: The data contained in this Preliminary Test Procedure is subject to change as a result of the Phase II evaluation program, conducted prior to delivery of the processor.

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MECHANICAL FUNCTION EVALUATION

Section 1 - Preparation

1. Examine the machine to ensure that all components, access panels, magazine, etc., are present.
2. Visually inspect the machine for any signs of physical damage, deep gouges, dents, etc.
3. After locating the machine in the operating area, check the level of the machine about both axes.
4. Connect the processor to a floor drain, or to a sink.

   NOTE: A sump pump is provided on the processor. — ? check
5. Connect the machine to a fresh water supply.

   NOTE Provision is made on the processor for installation

STAT of a [ ] water conservation (W. C. S.^{R}) system.
6. Ensure that all machine switches are in the OFF position, and plug in the electrical supply.

   NOTE 1 A 110/220 volt, 60 cycle, 3 wire system (2 phase, and neutral) 120 amp protected supply across each phase is required.

   NOTE 2 The processor is fully sequenced for automatic switching of electrical circuits through enabling relays to ensure a gradual build-up to maximum operating load.

MECHANICAL FUNCTION EVALUATION

Section 2 - Temperature Control Tests

1. Fill all tanks with clean water and note the temperature after filling.

2. To bring the processor up to temperature the following sequence is required.

   a) Operate "power" switch to ON.

   b) Check that the liquid level indicator lamp for all five tanks is safe.

      NOTE If any of the five tanks have a low liquid level this light will indicate this, and by inter-locking circuitry will prevent the recirculation pumps used for warm-up only from being energized.

   c) To bring the solution in each of the five tanks up to temperature, the manual "warm-up" switch for each must be operated. As a result, the heater elements, the recirculation pumps are operated until process temperature is reached, and the "ready" light for each tank illuminates. The booster heater is then cut-out, and the thermostatically controlled heater continues to cycle to maintain the temperature.

   d) When the "ready lights" illuminate, the "process" switch may be operated to "ON" to start the air blower, vacuum pump, and five seconds later the process pumps. (The recirculation

Section 2 (cont.)

pumps automatically stop, and the main process pumps will only operate if at this time the tank liquid levels are correct).

3. Following this the machine may be threaded and if required the transport "Drive" switch operate to commence processing.

4. After the "Drive" and "Process" switch are switched to OFF the main process pumps cease and after 5 seconds the air blower and vacuum pump also, the five tanks remain on stand-by temperature control with the recirculating pump functioning, unless the main "Power" switch is turned OFF.

5. At regular intervals during the time the processor is coming up to its operating temperature of 110°F check the temperature of the tanks with a standard mercury thermometer and also record the temperatures shown on the indicator.

6. After the machine has reached temperature as determined by a mercury thermometer check the temperature reading of the indicators; and note the total warm-up time.

NOTE The indicated temperatures may be calibrated to the mercury thermometer readings by means of the bezel ring.

7. With the processor at operating temperature determine that the temperature control system maintains it at this temperature within a tolerance of - 0.5°F over a period of several hours.

Section 2 (cont.)

8. During this period also conduct regular visual checks for signs of leakage from pumps, pipe connections, etc.

MECHANICAL FUNCTION EVALUATION

Section 3 - Transport System Tests

1. With the tanks full of clean water at operating temperature, and with temperature control system operating, conduct the following transport system tests.
2. Switch on the air blower.
3. Inspect the machine for undue vibration, check for any loose screws or attachments, etc. Note and record the amperage drawn by the blower.
4. Load the magazine with 1000 feet of obsolete film.
5. Thread the machine and turn on the transport drive system, note sequence switching. (Sect. 2) Check the operation of the vacuum capstan by pulling on the film to ensure that a proper level of negative pressure is exerted on the film. No slippage of the film over the capstan must occur, neither must the vacuum produce marks or indentations on the film.
6. Check that the film take-up system is operating satisfactorily.

   NOTE No excessive tension must be placed on the film, nor must the film be permitted to build up a slack loop.

7. Check the film carefully throughout its length to determine if there are any signs of base or emulsion scratching or scuffing.

Section 3 (cont.)

8. If signs of scuffing are present:

   a) Check the operation of each pump.

   b) Check the operation of the blower.

   c) Check the air flow through the air knife of each impingement module.

   d) Check the air flow through the drier air knives.

9. Transport the film at various significant speeds up to the maximum required, and check transport system for smooth operation. No jerky motion or visible pauses should be apparent. The set film speeds should be checked with a Tachometer.

10. During transport of the film periodically check that the temperature control system is maintaining the temperature in each tank within the permitted tolerance.

MECHANICAL FUNCTION EVALUATION

Section 4 - Drier Tests

The following functional checks of the drier are to be conducted immediately prior to the sensitometric testing, since the drying condition of photographic film is modified by immersion in processing solutions, the processor must therefore be filled with the correct solutions for these tests. Samples of the specified films are to be used, but no image exposure is necessary since the objective of these tests is to determine the drier performance only.

1. Operate the processor at the processing speeds detailed for each film type in the Sensitometric Evaluation Section. Both widths of film, 70mm, and 9 1/2 ins. are to be used.
2. Process a sufficient length of film (approx. 40 feet) of each width and type.
3. Check the sample for adequate drying by feel. Carefully examine both surfaces for scratches, water marks, deformation or shriveling.
4. During the above test period, and as consecutively longer as necessary, check the integrity of all liquid systems for time equivalent to a 1000 feet run at 10 Fpm, at least 10 times with a 15 minute period between runs for checking of all pump seals,

Section 4 (cont.)

pipe joints, connections, module seals, etc., for signs of leakage.

5. The infrared generator voltage should be increased slowly, only to the minimum level required to dry the type of film under test. Running the drier at higher voltages than necessary must be avoided.

MECHANICAL FUNCTION EVALUATION

Section 5 - Daylight Operation Tests

The following tests are also to be conducted immediately prior to the sensitometric evaluation, and are to determine the integrity of the processor for daylight operation.

1. Place samples of unexposed film in the magazines in a darkroom. Place the magazine in a brightly lit area. Remove the film samples in a darkroom, tray process and examine for fogging due to light leakage into the magazine.

2. Load the machine with unexposed film in a darkroom, place on all covers, switch on all room lights, remove and process the film in a darkroom. Examine for fogging due to light leakage into the processor. If light leakage exists the location may be determined by the area of fogging in the length of film used. This area should be examined to ensure that the covers have been properly fastened.

SENSITOMETRIC EVALUATION

Section 6 - General Film Preparation

1. The following film types in widths of 70mm, and 9 1/2 inch are to be sensitometrically evaluated in the 9 1/2 [redacted] STAT

[redacted] STAT

2. The sensitometric performance of the processor is based on the closest possible match to standard samples of each film exposed and tray processed per manufacturers standards as specified [redacted] STAT

[redacted] STAT

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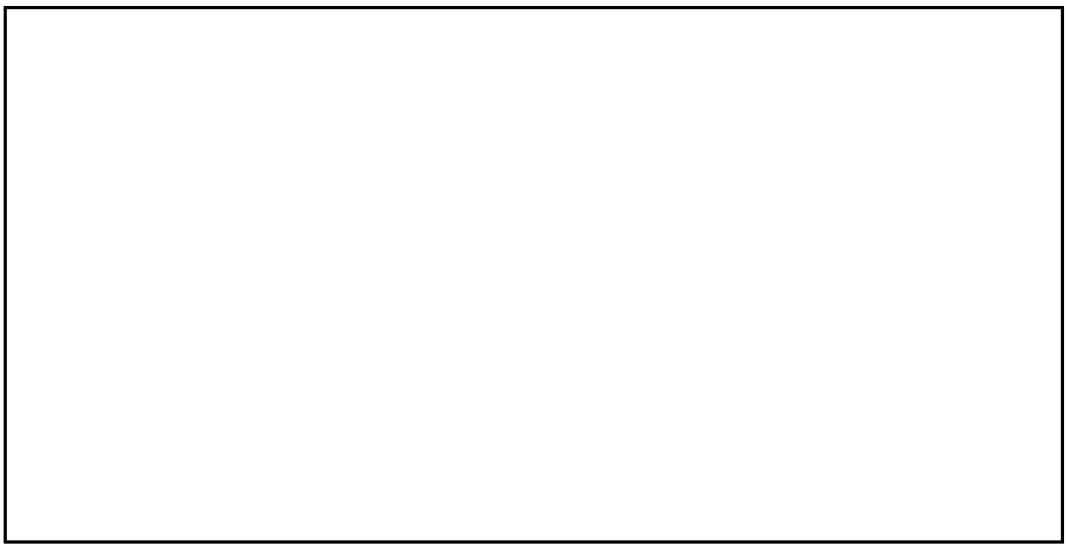

3. Reference Film Sample Exposure Data

The following exposing data was used for both the reference and Sepratron film samples.

1) Instrumentation Used

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[ ] Sensitometer [ ]

STAT

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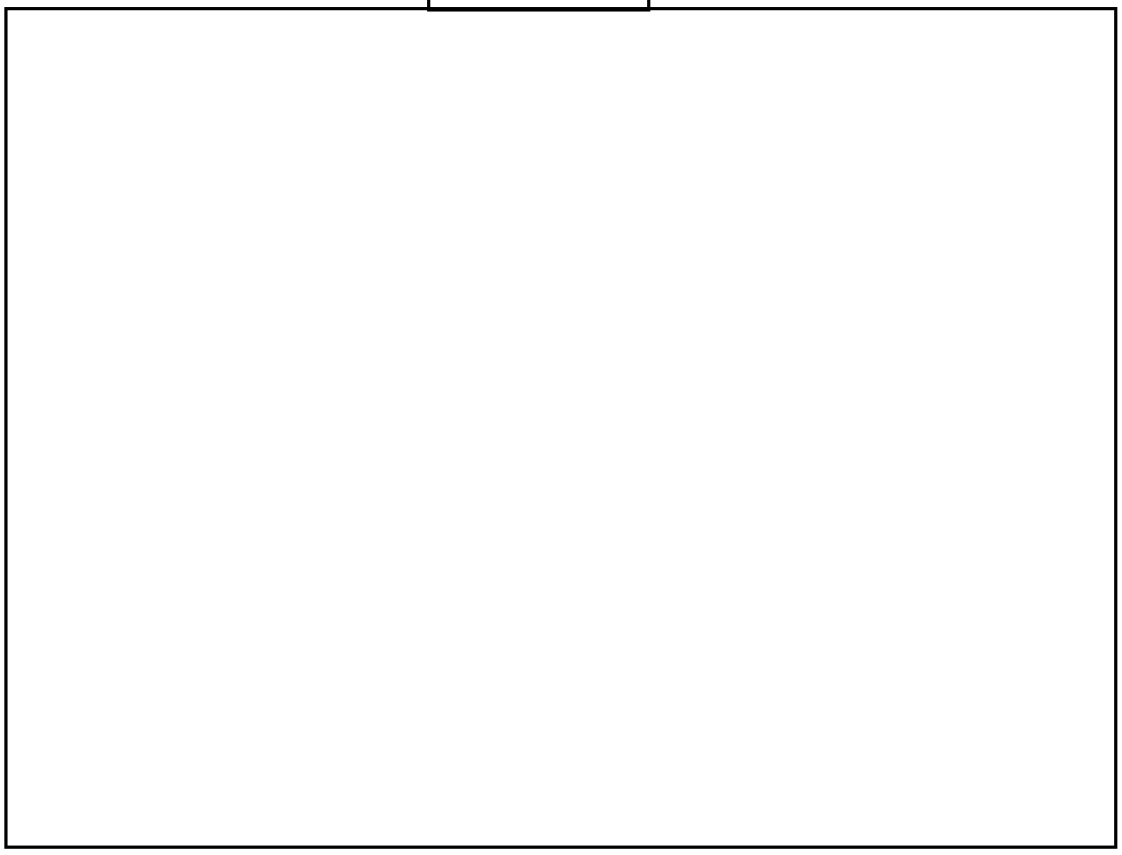

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4. Sensitometric film samples of each type, in each of the two widths, are to be prepared in accordance with Fig. 1. These samples are for use in evaluating the following parameters:

   1. Gamma
   2. Photographic Speed
   3. D. min. - D. max.
   4. Development uniformity edge to edge
   5. Resolution
   6. Complete Fixation
   7. Archival Quality per ASA PHl. 28-1957.
   8. Replicate processing runs are to be made to evaluate the reproducibility.
   9. Oxidation of Developer

5. To determine the capability of the replenishing system, 1000 feet lengths of the five films types are to be prepared with the tests pattern arrangement shown in Fig. 1 duplicated continuously throughout the 1000 feet length.

6. After preparation and exposure of the above test films they are to be conditioned as follows:

The samples should be kept under conditions which will not significantly affect the latent image. A period of two hours after exposures, to ensure latent image stability must elapse before the film sample is either processed, or placed under refrigeration. The temperature of the refrigerator must be maintained at 45°F. After removal from the refrigerator at least three hours at normal room temperature must be allowed before processing.

Section 7 - Chemistry

1. General - The developer formulated in Phase 1 of this program was a modification of the Navy Rapid Developer, NRD-29, [redacted] STAT

STAT [redacted] chemistry, as detailed in Appendix 'A'. The prototype

STAT [redacted] has been designed on the basis of the results obtained in

STAT the breadboard in Phase 1 with this chemistry.

STAT [redacted] inal acceptance tests at [redacted] at the request of the customer, will e conducted first with standard chemistry provided to [redacted] and STAT ompared to results obtained with the chemistry the machine was esigned for.

[redacted] he processor is designed around a maximum processing rate of 0 Fpm. The normal processing temperature is 110°F. The film ransport system is variable between zero and 30 Fpm to provide the necessary flexibility in processing parameters.

Section 8 - Sensitometric Performance

1. The sensitometric performance of the processor will be evaluated as follows:

   a) Evenness of density - a density variation of not more than 0.05 at a nominal density of 1.0.

   b) Gamma, speed, D. min., D. max., resolution. - Compared to reference film samples.

   c) Fixation. Sulfide tests for complete fixation.

   d) Wash water - consumption to be determined. Based on archival quality requirements.

   e) Archival quality - per ASA PH1-28-57.

   f) With a replenishment system, comprising plug-in bottles, a maximum of 1000 feet of 9 1/2 inch film is to be processed and evaluated.

2. The processor is to be operated for each type of film with the chemistry specified, at a temperature throughout the processor of 110°F, at the required processing rate for the particular film. Each film sample is to be processed and read, and D log E curves of the reference samples prepared as described previously.

3. The resolution targets are to be evaluated and plotted, also the uniformly exposed areas for uniformity of development and mottling.

4. On completion of Phase II, in-house evaluation program, the data representing the maximum performance of the processor will be provided as reference for the final test procedure.

APPENDIX 'A'

1. The formula for NRD-29 (Navy Rapid Developer for Aerial Film) as used in the testing is as follows:

Water 100°F	750.0 Ml
Metol	5.0 grams
Sodium Sulfite, Des	50.0 grams
Hydroquinone	20.0 grams
Sodium Hydroxide	10.5 grams
Potassium Bromide	8.0 grams
Water to Make-up	1.0 liter

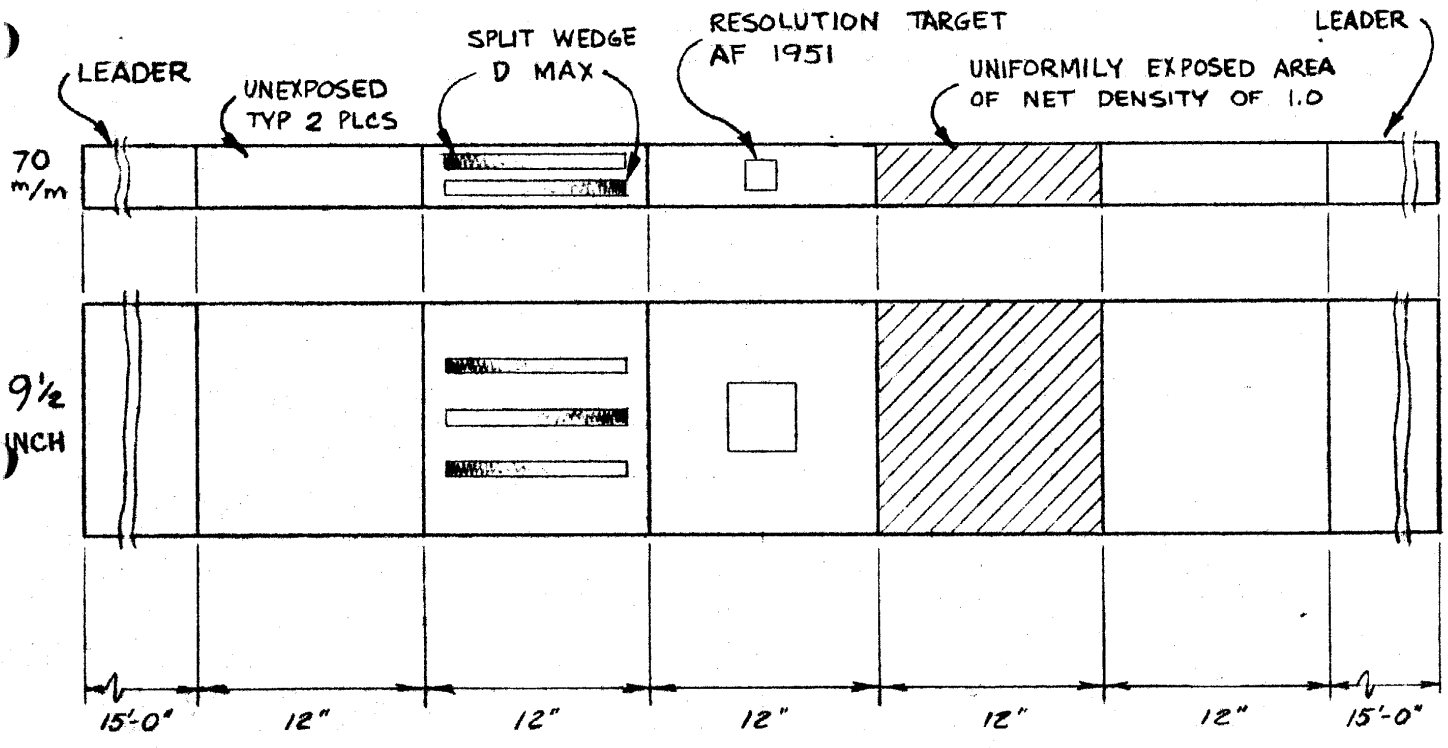
2. Stop bath 2% solution acetic acid

STAT 3. [redacted] proprietary chemistry

STAT [redacted] Fixer

[redacted] Hypo Eliminator

TEST SAMPLES



STAT [ ] 9-1/2" [ ] PROCESSOR STAT

A. Electrical Requirements:

1. Voltage - 110/220 volts AC
2. Current - 100 (120) amps/phase (2) 4 WIRE
3. Frequency - 60 cps
4. Number of phases - 2
5. Number of wires - 4
6. Type of outlet - twist lock

B. Floor Space Required: (Including maintenance space)

1. 7 ft. 4 in. high
2. 9 ft. 6 in. wide
3. 17 ft. long

C. Water Requirement:

1. Tap 68^{o}-70^{o}F
2. Filtration - max permissible particle size in microns and the max permissible count: 10 microns.
3. Pipe Requirement: copper - size 1 in.

D. Air Conditioning:

1. Room temperature of 70 - 75^{o} F
2. Humidity of 40- 45%